Евразиатский энтомол. журнал 24(3): 142–146
doi 10.15298/euroasentj.24.03.03

Rove beetles (Coleoptera, Staphylinidae) — inhabitants of the nests of birds of the family Turdidae

Стафилиниды (Coleoptera, Staphylinidae) — обитатели гнёзд птиц семейства Дроздовые (Aves, Turdidae)

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Key words: ecological groups, European part of Russia, fauna, nidicoles, thrush.

Ключевые слова: дрозды, европейская часть России, нидиколы, фауна, экологические группы.

Abstracts. The paper presents the results of studies of the Staphylinidae fauna in the nests of the birds *Turdus iliacus* (Linnaeus, 1766)*, T. philomelos* (Brehm, 1831)*, T.pilaris* (Linnaeus, 1758) and *T. merula* Linnaeus, 1758. 40 species of Staphylinidae were identified. Three species, *Xylodromus affinis* (Gerhardt, 1877), *Haploglossa gentilis* (Maerkel, 1844) and *H. nidicola* (Johansen, 1914), are obligate nidicoles. Seven species, *Aleochara bilineata* Gyllenhal, 1810, *A. bipustulata* (Linnaeus, 1760), *A. curtula* (Goeze, 1777), *Crataraea suturalis* (Mannerheim, 1830), *Falagria sulcatula* (Paykull, 1789), *Haploglossa villosula* (Stephens, 1832) and *Heterothops quadripunctulus* (Gravenhorst, 1806), belong to the group of facultative nidicoles. 30 species are accidental inhabitants of bird nests. Three species of Staphylinidae were observed in the nests of *Turdus iliacus* (L.), 10 — *T. philomelos* (Brehm), 14 — *T. pilaris* (L.), 24 — in the nests of *T. merula* L.

Резюме. В статье представлены результаты исследований фауны стафилинид в гнёздах дроздов *Turdus iliacus* (Linnaeus, 1766)*, T. philomelos* (Brehm, 1831)*, T. pilaris* (Linnaeus, 1758) и *T. merula* Linnaeus, 1758. Выявлено 40 видов стафилинид, три из которых: *Xylodromus affinis* (Gerhardt, 1877), *Haploglossa gentilis* (Maerkel, 1844) и *H. nidicola* (Johansen, 1914), являются облигатными нидиколами, ещё семь видов: *Aleochara bilineata* Gyllenhal, 1810, *A. bipustulata* (Linnaeus, 1760), *A. curtula* (Goeze, 1777), *Crataraea suturalis* (Mannerheim, 1830), *Falagria sulcatula* (Paykull, 1789), *Haploglossa villosula* (Stephens, 1832) и *Heterothops quadripunctulus* (Gravenhorst, 1806), относятся к группе факультативных нидиколов, остальные 30 видов — случайные обитатели гнёзд птиц. Три вида стафилинид отмечены в гнёздах дрозда-белобровика, 10 — певчего дрозда, 14 — рябинника, 24 — в гнёздах чёрного дрозда.

Introduction

Nidicoles is the ecological group of insects (Insecta, Coleoptera) that includes species that inhabit the nests or burrows of birds and mammals. Rove beetles (Coleoptera, Staphylinidae) regulate the number of bird parasites and can consume organic residues in the nests of thrushes, which inhabit different types of biotopes and nest openly at a wide range of heights. As in any community, a stable element consisting of obligate nidicoles and a labile complex of facultative nidicoles and random species can be distinguished in the nidicolous fauna of bird nests [Sazhnev, Matjukhin, 2022]. Insufficient knowledge of the nidicolous fauna of rove beetles in the nests of birds of some families and ecological groups does not allow us to assess their role in the life of birds and the functioning of the ecosystem. Despite a number of publications, this interesting ecological group of beetles is still poorly studied. There is some information on the family Staphylinidae from the nests of various bird species [Kirshenblat, 1935; Hicks, 1959; Lundyshev, 2005, 2009, 2015; Pisanenko, Lundyshev, 2010; Sazhnev, Matyukhin, 2020, 2023]. There are several works on nidicolous Coleoptera inhabiting thrush nests [Ryndevich, Lundyshev, 2004; Lundyshev, 2008; Lundyshev, Orlov, 2016; Sazhnev, Matyukhin, 2019], but the first one examines the facultative relationships of some species of Dytiscidae and Hydrophilidae with thrush nests, the second one provides information on the location of ten, in the third — five, in the fourth — two species of Staphylinidae.

How to cite this article: Ditts A.A., Artemjev A.V., Sazhnev A.S., Selivanova N.P., Matjukhin A.V. 2025. Rove beetles (Coleoptera, Staphylinidae) – inhabitants of the nests of birds of the family Turdidae // Euroasian Entomological Journal. Vol.24. No.3. P.142–146. https://doi.org/10.15298/euroasentj.24.03.03

The aim of our research was to determine the species composition of Staphylinidae beetles inhabiting the nests of birds of the thrush family (Turdidae), order Passeriformes, using original and literary data [Lundyshev, 2008; Lundyshev, Orlov, 2016; Sazhnev, Matjukhin, 2022].

Materials and Methods

The research area covered the vicinity of the cities of Kislovodsk (2005 and 2007), Moscow (Kuskovo and Terletsky Park, 2008–2010) and Syktyvkar (2022), located on the territory of Russia. The material was collected by A.V. Artemyev, A.S. Sazhnev, N.P. Selivanova, A.V. Matjukhin using standard entomological methods — preliminary sieving of nest material and litter through soil sieves and manual collection, also using Berlese-Tullgren eclectors. A total of 11 nests of White-browed Thrush *Turdus iliacus* (Linnaeus, 1766), 13 nests of Song Thrush *Turdus philomelos* (Brehm, 1831), 35 nests of Mountain Ash Thrush *Turdus pilaris* (Linnaeus, 1758) and three nests of Blackbird *Turdus merula* Linnaeus, 1758 were examined. Rove beetles were not found in all nests, but were present in 36 % of *T. iliacus* nests, 56 % of *T. pilaris* nests, and 100 % of both *T. philomelos* and *T. merula* nests. A total of 432 Staphylinidae imago were collected: 10 specimens — in the nests of *T. iliacus*, 8 specimens — *T. philomelos*, 317 specimens — *T. pilaris*, 97 specimens — *T. merula*. The definition of the beetles was carried out by the first author using determinative keys [Kirshenblat, 1935; Lohse, 1964, 1974]. In addition, previously published data on 21 specimens of rove beetles from the nests of *T. iliacus*, *T. philomelos*, *T. pilaris* from the territory of Belarus [Lundyshev, 2008; Lundyshev, Orlov, 2016] and two specimens from the nest of T. pilaris in Moscow [Sazhnev, Matjukhin, 2019] were used to compile a more complete list of staphylinid species. These species are marked with * in the list (Table 1).

The present work is registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:3FFD69EA-938F-49D4-8F18-5D9C7F06D00F

Results and Discussion

Thrushes (Passeriformes, Turdidae) have a wide distribution across Eurasia. They use a variety of materials to build their nests.

The white-browed thrush *Turdus iliacus* (Linnaeus, 1766) is distributed in northern Eurasia from Iceland, Scotland and Scandinavia almost to Chukotka, from the northern steppe zone to the northern edge of the willow tundra. It is a common species in the boreal zone, forest tundra and southern tundra. Nesting habitats are forests of different types, especially mixed, of different ages, with good undergrowth. Birds nest in pairs, but there are cases of colonial nesting. The nest is a solid and carefully constructed structure with a mud bowl inside based on coarse grass and leaves, the lining of the bowl is grass. Nest sites are varied. They are often built low above the ground on bushes, stumps, inclined trunks, etc. Nests are rarely found in trees more than 3 m above the ground, and very often on the ground, usually on the trunk of a tree, under bushes or on a pile [Ryabicev, 2008].

The Song Thrush *Turdus philomelos* (Brehm, 1831) is found mainly in the boreal zone of Eurasia from the Atlantic Ocean to Lake Baikal and the Lena River. It is a common species of forest and forest-steppe zones. It lives in coniferous and mixed forests. It likes to nest in young spruce forests, on the edges of the forest, and also tends to nest in river floodplains. There are no colonies. The nest is on a tree, usually on the trunk itself, most often on a small spruce, 1–4 m above the ground, rarely higher (up to 20 m). The base of the nest is made of thin twigs (usually spruce) and stems of grasses, with moss, dry grass, lichens, roots. All this is cemented with mud, the lining being mostly moss. The tray is smeared with rotten wood dust, glued with saliva, sometimes mixed with wet mud. There is no lining in the bowl [Mikheev, 1975], it is a regular hemisphere made of this kind of «cardboard», and the eggs lie directly on its surface. There are 4–6 eggs in a clutch, more often — 5 eggs. The incubation period is 13–14 days, the chicks stay in the nest for 12–16 days [Ryabicev, 2008].

The Mountain Ash Thrush *Turdus pilaris* (Linnaeus, 1758) inhabits different zones — from the steppes to the tundra, in the area from western Europe to eastern Siberia. Its distribution is very uneven, but it is common or abundant in most areas. Breeding habitats vary greatly, from dense forests to open areas with shrubs, but birds prefer mixed forests with clearings and their edges near water. There is a noticeable attraction to the outskirts of villages, urban woodlands and parks. Most birds live in sparse colonies and single pairs are often encountered. Nests are located in tree forks, on side branches, in semi-hollows, on bushes, on stumps and broken trunks, sometimes on buildings and even inside rarely visited buildings, at heights of up to 25 metres. The nest is bowl shaped, formed in three layers, with a base of coarse grass, horsetail, thin twigs, all cemented with mud. A bowl is made of the same mud with grass, which the birds line with grass from the inside [Malovichko et al., 2017]. There are 4–8 eggs in a clutch, more often 5–6. Only the female incubates for 13–14 days. Chicks stay in the nest for 14–16 days [Ryabicev, 2008].

The Blackbird *Turdus merula* Linnaeus, 1758 is widespread throughout Europe and a large part of Asia, from the Mediterranean to eastern China. The species prefers broad-leaved, mixed and coniferous forests with dense undergrowth, usually near a river, stream or other moist places, floodplain alder and bird cherry trees, overgrown gardens and parks. The nests are located high above the ground (up to 7–8 m) — on firs, pines, birches and other trees, and very low — on small spruces, stumps and even on the ground, between the roots of old large trees. The nest is cup-shaped, made of dry herbaceous stems, leaves, lichens, moss and thin twigs, reinforced with mud and lined with grass. Only the female builds the nest. There are 3–6 eggs in a clutch, more often 4–5. The incubation period is 12–15 days, about the same time the chicks are sitting in the nest [Mikheev, 1975; Ryabicev, 2008].

Table 1. Species composition of Staphylinidae in the nests of birds
Таблица 1. Видовой состав стафилиниd в гнёздах птиц

Subfamily	Species	Nests of birds:			
		T. iliacus	*T. philomelos*	*T. pilaris*	*T. merula*
Pselaphinae	*Euplectus brunneus* Grimmer, 1841	–	1	–	–
	**Euplectus mutator* Fauvel, 1895	–	–	1	–
Omaliinae	*Omalium caesum* Gravenhorst, 1806	–	–	–	7
	Omalium rivulare (Paykull, 1789)	–	–	–	3
	Omalium septentrionis C.G.Thomson, 1857	–	–	–	5
	Xylodromus affinis (Gerhardt, 1877)	–	3	–	2
Proteininae	*Proteinus laevigatus* Hochhuth, 1872	–	–	–	1
Oxytelinae	**Anotylus tetracarinatus* (Block, 1799)	–	1	–	–
	**Carpelimus corticinus* (Gravenhorst, 1806)	–	1	–	–
	Coprophilus striatulus Fabricius, 1793	–	–	–	–
Phloeocharinae	**Phloeocharis subtilissima* Mannerheim, 1830	1	–	–	–
Tachyporinae	*Sepedophilus littoreus* (Linnaeus, 1758)	–	–	–	5
	**Tachinus fimetarius* Gravenhorst, 1802	–	–	1	–
Aleocharinae	*Aleochara bilineata* Gyllenhal, 1810	7	–	27	2
	Aleochara bipustulata (Linnaeus, 1760)	–	–	–	2
	**Aleochara curtula* (Goeze, 1777)	–	–	1	–
	Atheta crassicornis Panzer, 1808	–	4	1	–
	Atheta fungi (Gravenhorst, 1806)	–	–	27	1
	Atheta nidicola (Johansen, 1914)	3	3	70	6
	**Atheta nigricornis* (Thomson, 1852)	–	1	3	–
	**Atheta trinotata* (Kraatz, 1856)	–	–	3	–
	**Atheta vaga* (Heer, 1839)	–	1	–	–
	Atheta sp.	–	–	–	2
	Autalia longicornis Scheerpeltz, 1947	–	–	–	2
	Crataraea suturalis (Mannerheim, 1830)	–	–	–	17
	Falagria sulcatula (Paykull, 1789)	–	–	–	7
	Geostiba circellaris (Gravenhorst, 1806)	–	–	–	2
	Haploglossa gentilis (Maerkel, 1844)	–	–	104	–
	Haploglossa nidicola (Fairmaire, 1853)	–	–	83	12
	**Haploglossa villosula* (Stephens, 1832)	–	–	2	–
	**Leptusa pulchella* Baudi di Selve, 1870	–	2	–	–
	Liogluta granigera (Kiesenwetter, 1850)	–	–	–	5
	Oxypoda alternans (Gravenhorst, 1802)	–	–	–	5
Staphylininae	*Heterothops quadripunctulus* (Gravenhorst, 1806)	–	–	–	2
	Quedius boops (Gravenhorst, 1802)	–	–	–	1
	Quedius brevicornis (C.G.Thomson, 1860)	–	–	–	1
	**Quedius cruentus* (A.G.Olivier, 1795)	–	1	–	–
	Quedius limbatus (Heer, 1839)	–	–	–	1
	Philonthus succicola C.G.Thomson, 1860	–	–	5	–
	Xantholinus linearis Blatchley, 1910	–	–	1	1
Number of specimens		11	18	329	97
Number of species		3	10	14	24

* — literature data.
* — литературные данные.

A total of 40 species of Staphylinidae from eight subfamilies were recorded in the nests of four thrush species, according to the results of the determination of coleopterological material (Fig. 1). Half of the species composition is represented by the genera *Aleochara* Gravenhorst, 1802, *Atheta* C.G. Thomson, 1858, *Autalia* Leach, 1819, *Crataraea* Thomson, 1858, *Falagria* Leach, 1819, *Geostiba* Thomson, 1858, *Haploglossa* Kraatz, 1856, *Leptusa* Kraatz, 1856, *Liogluta* Thomson, 1858 and *Oxypoda* Mannerheim, 1830 from the subfamily Aleocharinae.

The group of obligate nidicoles comprises three species: *Xylodromus affinis* (Omaliinae), *Haploglossa gentilis* and *H. nidicola* (Aleocharinae). The facultative nidicoles are members of the subfamily Aleocharinae — *Aleochara bilineata*, *A. bipustulata*, *A. curtula*, *Crataraea suturalis*, *Falagria sulcatula*, *Haploglossa villosula* and Staphylininae — *Heterothops quadripunctulus*. The

remaining 30 species are random inhabitants of bird nests (Table 1).

Only three species of Staphylinidae were recorded in the nests of the white-browed thrush: the two obligate nidicoles *Atheta nidicola* and *Aleochara bilineata*, and the occasional species *Phloeocharis subtilissima*. The Staphylinidae fauna is more diverse in Song Thrush nests (10 species of beetles were recorded). Facultative nidicoles were absent and five random species (*Anotylus tetracarinatus, Carpelimus corticinus, Atheta vaga, Leptusa pulchella, Quedius cruentus*) were found only in the nests of this species (Fig. 2). 14 species of Staphylinidae were identified in the nests of the Mountain Ash Thrush. The peculiarity of the Staphylinidae fauna of these nests is that obligate nidicoles account for 78% of the abundance of all beetles (Fig. 3). The highest diversity of rove beetles (24 species) was found in the nests of the Blackbird. This may be due to the fact that this species inhabits many biotopes, nests at a wide range of heights, uses a variety of building materials, soft and relatively strong litter in the nest, and that the nests of blackbird thrushes are the most abundant in rove beetles (24 species).

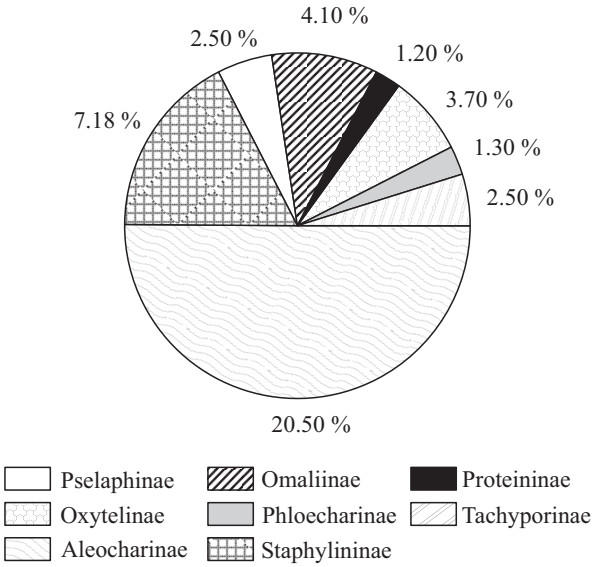


Fig.1. Taxonomic structure of the Staphylinidae beetles found in the nests of birds of the Turdidae family.

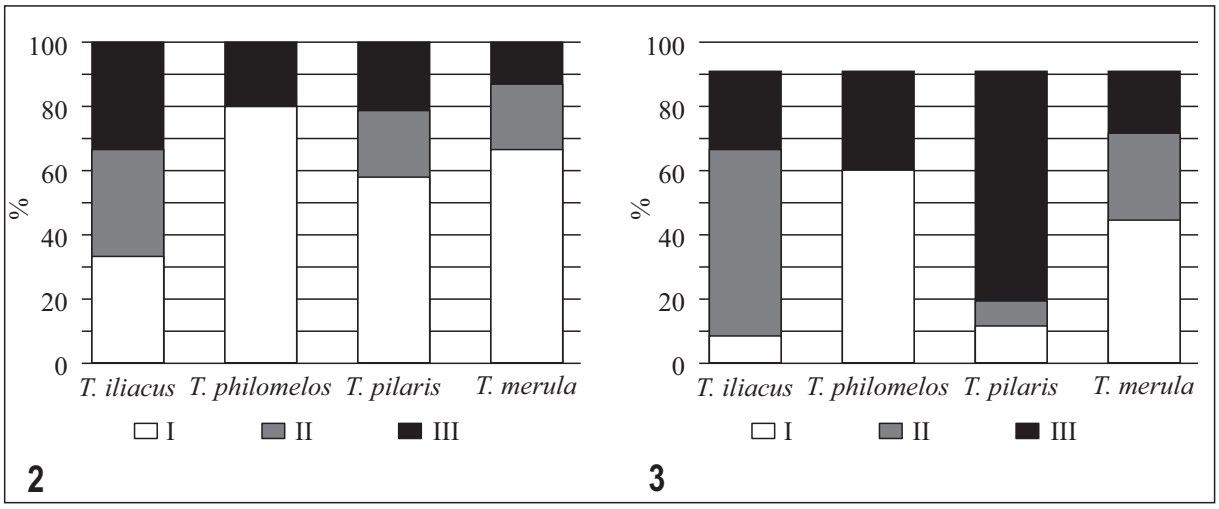
Рис.1. Таксономическая структура жуков семейства Staphylinidae, встречающихся в гнёздах птиц семейства Turdidae.

Conclusion

A total of 40 species of Staphylinidae were recorded in bird nests, half of which belonged to the subfamily Aleocharinae. Three species of Staphylinidae were found in four of the 11 nests of *T. iliacus*, 10 species of beetles in 13 nests of *T. philomelos*, 14 species of rove beetles in 22 of 39 nests of *T. pilaris*. The highest species richness (24 species) was recorded in three nests of *T. merula*. Ten species of rove beetles belong to the group of nidicoles as part of the staphylinid fauna of thrush nests (Passeriformes, Turdidae). These species are numerous and often found in bird nests. A further 30 species of Staphylinidae are accidental occurrences in thrush nests. They are represented by single individuals. They are also found in microhabitats other than bird nests, such as litter, anthills, fungi and decaying wood. The staphylinid beetles (Coleoptera, Staphylinidae) have once again proved to be an ecologically plastic group of insects.

Acknowledgements

The work was carried out within the framework of the research projects «Faunal diversity, spacial and ecological structure of animal communities in the North-East of European Russia and adjacent areas in the context of environmental changes and development», reg. No. 122040600025-2, «Patterns of formation, spatial and structural organization and dynamics



Figs 2–3. Ecological structure of the family Staphylinidae in the nests of birds of the family Turdidae. 2 — by number of species; 3 — by number of individuals. Designations: I — random inhabitant, II — facultative nidicol, III — obligate nidicol.

Рис. 2–3. Экологическая структура семейства Staphylinidae в гнёздах птиц семейства Turdidae. 2 — по числу видов; 3 — по числу особей. Обозначения: I — случайный обитатель, II — факультативный нидикол, III — облигатный нидикол.

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Поступила в редакцию 3.9.2024